CLAIMS

1. An anisotropic conductive film, wherein an electrically insulative porous film made of synthetic resin is used as a base film, and conductive parts capable of being provided with conductiveness in the film thickness direction are formed independently at plural positions of the base film by adhering conductive metal to resinous parts of porous structure in such a manner as piercing through from a first surface to a second surface.

2. An anisotropic conductive film according to claim 1, wherein each conductive part is formed of conductive metal adhered to resinous part of porous structure on the wall surface of a through-hole extending from a first surface to a second surface at plural positions of the base film.

3. An anisotropic conductive film according to claim 1 or 2, wherein each conductive part is formed of conductive metal particles continuously adhered to resinous part of porous structure.

4. An anisotropic conductive film according to claim 3, wherein the conductive metal particles are electroless plating particles of conductive metal.

5. An anisotropic conductive film according to any one of claims 1 to 4, wherein the porous film is a porous polytetrafluoroethylene film.

6. An anisotropic conductive film according to claim 5, wherein the resinous parts of porous structure are composed of fibrils and nodes, each consisting of polytetrafluoroethylene, the nodes being connected to each

other by the fibrils.

7. An anisotropic conductive film according to any one of claims 1 to 6, wherein the conductive parts are formed of conductive metal adhered to the resinous parts of porous structure in a manner in which the porous structure of the porous film is maintained.

8. An anisotropic conductive film according to any one of claims 1 to 7, wherein conductiveness is afforded only in the film thickness direction by applying compressive pressure in the film thickness direction.

9. A method of making an anisotropic conductive film, wherein conductive parts capable of being afforded with conductiveness respectively in the film thickness direction are provided independently of each other in a piercing manner from a first surface to a second surface by adhering conductive metal to resinous parts having porous structure at plural positions in a base film made of an electrically insulative porous film consisting of synthetic resin.

10. A manufacturing method as set forth in claim 9, wherein conductive parts are provided by forming through-holes piercing from a first surface to a second surface at plural positions of the base film and by adhering conductive metal continuously to the resinous parts of porous structure in the wall surfaces of the through-holes.

11. A manufacturing method as set forth in claim 10, wherein the through-holes piercing from a first surface to a second surface are formed at plural positions of the base film by irradiating synchrotron radiation

rays or laser beams having a wavelength of 250 nm or less.

12. A manufacturing method as set forth in claim 10, wherein the through-holes piercing from a first surface to a second surface are formed by ultrasonic wave processing at plural positions of the base film.

13. A manufacturing method as set forth in any one of claims 9 to 12, wherein the conductive parts are provided by adhering conductivity metal particles to the resinous parts of porous structure.

14. A manufacturing method as set forth in any one of claims 10 to 13, wherein conductive metal is adhered by electroless plating to the resinous parts of porous structure at the wall surfaces of the through-holes.

15. A manufacturing method as set forth in claim 14, wherein conductive metal is adhered by electroless plating through chemical reduction reaction, after catalytic particles for facilitating the chemical reduction reaction are adhered, to the resinous parts of porous structure at the wall surfaces of through-holes.

16. A manufacturing method as set forth in any one of claims 9 to 15, wherein the porous film is a porous polytetrafluoroethylene film.

17. A method of making an anisotropic conductive film, wherein conductive parts capable of being afforded with conductiveness respectively in the film thickness direction are provided independently of each other in a piercing manner from a first surface to a second surface by adhering conductive metal to resinous parts having porous structure at plural

positions in a base film consisting of a porous polytetrafluoroethylene film,

the method comprising the steps of:

(1) forming a three layer laminated body by fusion-bonding polytetrafluoroethylene films (B) and (C), which are to be mask layers, to both surfaces of a base film consisting of a porous polytetrafluoroethylene film (A);

(2) forming through-holes arranged in a pre-determined pattern in the laminated body by irradiating the surface of one of the mask layers with synchrotron radiation rays or laser beams having a wavelength of 250 nm or less through a light shielding sheet having a plurality of optically transparent parts provided independently of each other in the pre-determined pattern;

(3) adhering catalytic particles for facilitating chemical reduction reaction to the whole surface, including the wall surfaces of the through-holes, of the laminated body;

(4) peeling off the mask layers from both surfaces of the base film; and

(5) adhering conductive metal by electroless plating to resinous parts having porous structure on the wall surfaces of the through-holes.

18. A method of making an anisotropic conductive film, wherein conductive parts capable of being afforded with conductiveness respectively in the film thickness direction are provided independently of each other in a

piercing manner from a first surface to a second surface by adhering conductive metal to resinous parts having porous structure at plural positions in a base film consisting of a porous polytetrafluoroethylene film,

the method comprising the steps of:

(I) forming a three layer laminated body by fusion-bonding polytetrafluoroethylene films (B) and (C) as mask layers to both surfaces of a base film consisting of a porous polytetrafluoroethylene film (A);

(II) forming through-holes by using an ultrasonic head having at least one rod at the tip thereof and pressing the tip of the rod so as to apply ultrasonic wave energy to the surface of the laminated body, the through-holes being arranged in a pattern in the laminated body;

(III) adhering catalytic particles for facilitating chemical reduction reaction to the whole surface, including the wall surfaces of the through-holes, of the laminated body;

(IV) peeling off the mask layers from both surfaces of the base film; and

(V) adhering conductive metal by electroless plating to resinous parts having porous structure on the wall surfaces of the through-holes.

19. A method of making an anisotropic conductive film, wherein conductive parts capable of being afforded with conductiveness respectively in the film thickness direction are provided independently of each other in a piercing manner from a first surface to a second surface by adhering conductive metal to resinous parts having porous structure at plural

positions in a base film consisting of a porous polytetrafluoroethylene film,

the method comprising the steps of:

(i) forming a three layer laminated body by fusion-bonding porous polytetrafluoroethylene films (B) and (C) as mask layers to both surfaces of a base film consisting of a porous polytetrafluoroethylene film (A);

(ii) infiltrating liquid into porous parts of the laminated body and freezing the liquid;

(iii) forming through-holes in a pattern in the laminated body by using an ultrasonic head having at least one rod at the tip thereof and pressing the surface of the laminated body with the tip of the rod so as to apply ultrasonic wave energy thereto;

(iv) returning the freezing in the porous parts to liquid by increasing the temperature of the laminated body and removing the liquid;

(v) adhering catalytic particles for facilitating chemical reduction reaction to the whole surface, including the wall surfaces of the through-holes, of the laminated body;

(vi) peeling off the mask layers from both surfaces of the base film; and

(vii) adhering conductive metal by electroless plating to resinous parts having porous structure on the wall surfaces of the through-holes.

20. A manufacturing method as set forth in claim 19, wherein water or organic solvent is used as the liquid to be infiltrated into the porous parts in the step (ii) above.

21. A manufacturing method as set forth in any one of claims 9 to 20, wherein for adhering conductivity metal to the resinous parts of porous structure, conductive metal particles with a particle diameter of 0.001 - 5 μm are adhered at adhesion quantity of 0.001 - 4.0 g/ml.